Claims

1. A method for extraction of at least one bioactive substance from at least one natural source, the method comprising the steps of:

contacting a non-chlorinated fluorocarbon solvent with the at least one natural source so that the solvent extracts a quantity of at least one bioactive substance from the at least one natural source;

removing the non-chlorinated fluorocarbon solvent to isolate the at least one bioactive substance.

2. The method of claim 1 wherein the at least one natural source is selected from the group consisting of Kava root, Byrsonima species, Aesculus californica, Crataegus mexicana, Simmondsia chinensis, Pfaffia species, Bursera species, Turnera species, Heimia salicifolia, Psidium species, Enterlobium species, Ptychopetalum olacoides, Liriosma ovata, and Chaunochiton kappleri.

3. The method of claim 2 wherein the non-chlorinated fluorocarbon solvent is 1,1,1,2-tetrafluoroethane

4. The method of claim 2 wherein the extraction is performed as a batch-wise, continuous cascading, or countercurrent process.

5. The method of claim 4 wherein the extraction is performed at at least one pressure of 0 to 10 bar.

6. The method of claim 4 wherein the extraction is performed at least one pressure of 3.5 to 5.6 bar.

7. The method of claim 2 wherein the extraction is performed with a mixture of the non-chlorinated fluorocarbon solvent and at least one other volatile substance.

8. The method of claim 7 wherein the at least one other volatile substance is selected from the group consisting of butane, propane, carbon dioxide, hexane, ethanol, methanol, and a combination thereof.

9. The method of claim 7 wherein the mixture of the non-chlorinated fluorocarbon solvent and the at least one other volatile substance is in a supercritical or near critical fluid state.

10. The method of claim 2 further comprising the step of processing the at least one natural source to make a powder, paste, maceration, or mixture prior to contacting the at least one natural source with the non-chlorinated fluorocarbon solvent.

11. The method of claim 2 wherein the at least one natural source is combined with at least one cosolvent so that the extraction is a liquid - liquid process.

12. The method of claim 11 wherein the at least one cosolvent is selected from the group consisting of alcohols, weak acids, ketones, chloro derivatives, hydrocarbons, fluorinated hydrocarbons, acetates, ethers, and a combination thereof.

13. The method of claim 2 wherein the at least one bioactive substance is a plurality of bioactive substances.

14. The method of claim 13 further comprising the step of separating the plurality of bioactive substances to obtain at least one isolated and purified bioactive substance.

15. The method of claim 14 wherein separating is achieved by high pressure liquid chromatography, packed column supercritical fluid chromatography, or radial flow chromatography.

16. A method for extraction of at least one bioactive substance from at least one natural source selected from the group consisting of Kava root, Byrsonima species, Aesculus californica, Crataegus mexicana, Simmondsia chinensis, Pfaffia species, Bursera species, Turnera species, Heimia salicifolia, Psidium species, Enterlobium species, Ptychopetalum olacoides, Liriosma ovata, and Chaunochiton kappleri, the method comprising the steps of contacting a non-chlorinated fluorocarbon solvent with the at least one natural source so that the solvent extracts a quantity of at least one bioactive substance from the at least one natural source wherein the extraction is a batch-wise, continuous cascading or countercurrent

process; and removing the non-chlorinated fluorocarbon solvent to isolate the at least one bioactive substance.

17. A method for separating analytes contained in an extract, the method comprising the steps of:

running at least one volatile substance through a packed column, the at least one volatile substance being in a near-critical or supercritical fluid state;

passing the extract through the packed column; and

collecting the analytes which have been separated.

wherein the analytes are at least one bioactive substance and the extract is from a natural source.

18. The method of claim 17 wherein the at least one volatile substance is selected from the group consisting of ethanol, methanol, butane, propane, dichloromethane, tetrafluoroethane, isopropylamine, and a combination thereof.

19. The method of claim 17 wherein the packed column is selected from the group consisting of a C4 protein column, a NH_2 column, a CN column, a DIOL column, and a diphenyl column.

20. The method of claim 17 wherein the natural source is selected from the group consisting of Kava root, Byrsonima species, Aesculus californica, Crataegus mexicana, Simmondsia chinensis, Pfaffia species, Bursera species, Turnera species, Heimia salicifolia, Psidium species, Enterlobium species, Ptychopetalum olacoides, Liriosma ovata, and Chaunochiton kappleri.

21. A continuous cascading extraction method for extracting a plurality bioactive substances from at least one natural source, the method comprising the steps of:

placing a quantity of the at least one natural source into a plurality of extraction vessels;

passing a volatile substance through the plurality of extraction vessels in a continuous manner until a desired concentration of the plurality of bioactive substances in the volatile substance is reached;

removing the volatile substance to obtain a quantity of the plurality of bioactive substances.

22. The method of claim 21 wherein the at least one natural source is selected from the group consisting of Kava root, Byrsonima species, Aesculus californica, Crataegus mexicana, Simmondsia chinensis, Pfaffia species, Bursera species, Turnera species, Heimia salicifolia, Psidium species, Enterlobium species, Ptychopetalum olacoides, Liriosma ovata, and Chaunochiton kappleri.

23. The method of claim 21 wherein the volatile substance is a non-chlorinated fluorocarbon solvent.

24. The method of claim 23 wherein the non-chlorinated fluorocarbon solvent is 1,1,1,2-tetrafluoroethane.

25. The method of claim 21 wherein the extraction is performed at a pressure of 0 to 10 bar.

26. The method of claim 21 wherein the extraction is performed with a mixture of the non-chlorinated fluorocarbon solvent and at least one other volatile substance.

27. The method of claim 26 wherein the at least one other volatile substance is selected from the group consisting of butane, propane, carbon dioxide, hexane, ethanol, methanol, nitrogen, chloroform and combinations thereof.

28. The method of claim 26 wherein the mixture of the non-chlorinated fluorocarbon solvent and the at least one other volatile substance is in a supercritical or near critical fluid state.

29. The method of claim 21 further comprising the step of processing the at least one natural source to make a powder, paste, maceration, or mixture prior to placing the at least one natural source into the extraction vessel.

30. The method of claim 21 wherein the at least one natural source is combined with at least one cosolvent so that the extraction is a liquid - liquid process.

31. The method of claim 30 wherein the at least one cosolvent is selected from the group consisting of alcohols, weak acids, ketones, chloro derivatives, hydrocarbons, fluorinated hydrocarbons, acetates, ethers and combinations thereof.

32. The method of claim 21 further comprising the step of separating the plurality of bioactive substances to obtain at least one isolated and purified bioactive substance.

33. The method of claim 32 wherein separating is achieved by radial flow chromatography, high pressure liquid chromatography or packed column supercritical fluid chromatography.

34. An ingestible formula for treating neurological and vascular disorders comprising a therapeutic concentration of at least one bioactive substance extracted from a Byrsonima species by a continuous cascading extraction with a non-chlorinated fluorocarbon solvent.

35. The formula of claim 34 further comprising a therapeutic concentration of at least one bioactive substance from at least one other natural source.

36. The formula of claim 35 wherein the at least one other natural source is selected from the list consisting of Psidium species, Enterlobium species, and a combination thereof.

37. The formula of claim 36 wherein the Byrsonima species is Byrsonima crassifolia, the Psidium species is Psidium guajava, and the Enterlobium species is Enterlobium cyclocarpum.

38. The formula of claim 34 which is in the form of a tablet, capsule, pastille, or elixir.

39. An ingestible formula comprising a therapeutic quantity of at least one bioactive substance extracted from a Byrsonima species and a therapeutic quantity of at least one

bioactive substance extracted from a Psidium species, an Enterolobium species, or a combination thereof, wherein the at least one bioactive substance extracted from a Byrsonima species and the at least one bioactive substance extracted from a Psidium species, an Enterolobium species, or a combination thereof are extracted with an organic solvent, water, an organic solvent/water mixture, a supercritical fluid extraction, a dense gas extraction or combinations thereof.

40. The formula of claim 39 wherein the organic solvent is methanol, ethanol, ethyl acetate or combinations thereof.

41. The formula of claim 39 wherein the Byrsonima species is Byrsonima crassifolia, the Psidium species is Psidium guajava, and the Enterlobium species is Enterlobium cyclocarpum.

42. The formula of claim 41 wherein the therapeutic first quantity at least one bioactive substance extracted from a Byrsonima species is selected from the group consisting of β-sitosterol, betulin, proline, pipecolic acid, quercetin, catechin, and a combination thereof.

43. An ingestible formula for use as a cardiovascular tonic comprising a therapeutic concentration of a plurality of bioactive substances extracted from Aesculus species and Crataegus species by a continuous cascading extraction with a non-chlorinated fluorocarbon solvent.

44. The formula of claim 43 further comprising a therapeutic concentration of at least one bioactive substance from at least one other natural source.

45. The formula of claim 44 wherein the at least one other natural source is a Bursera species.

46. The formula of claim 45 wherein the Aesculus species is Aesculus californica, the Crataegus species is Crataegus mexicana, and the Bursera species is Bursera microphylla.

47. The formula of claim 43 which is in the form of a tablet, capsule, pastille, or elixir.

48. An ingestible formula comprising a therapeutic quantity of at least one bioactive substance extracted from an Aesculus species and a therapeutic quantity of at least one bioactive substance extracted from a Crataegus species, wherein the at least one bioactive substance extracted from an Aesculus species and the at least one bioactive substance extracted from a Cratageus species are extracted with an organic solvent, water, an organic solvent/water mixture, a near-critical or supercritical fluid extraction, a dense gas extraction, or a combination thereof.

49. The formula of claim 48 wherein the Aesculus species is Aesculus californica, and the Crataegus species is Crataegus mexicana.

50. The formula of claim 48 wherein the organic solvent is methanol, ethanol, ethyl acetate, or a combination thereof.

51. The formula of claim 48 wherein the therapeutic quantity of at least one bioactive substance extracted from an Aesculus species is selected from the group consisting of β-methyl alanine, phenylalanine, isohomoleucine, isohomo-6-hydroxyleucine, mino-4-methyl-hex-trans-4-enoic acid, gamma-glutamyl-2-A-hex-4-enoic acid, arbutin, hydroquinone, epicatechin, coumarin eleutheroside B-1, quebrachitol, and a combination thereof.

52. An extract of Jojoba for satiating hunger and reducing weight in humans, the extract comprising simmondsin, wherein the simmondsin is extracted from the Jojoba with an organic solvent, water, an organic solvent/water mixture, a near-critical or supercritical fluid extraction, a dense gas extraction, or a non-chlorinated fluorocarbon solvent.

53. The extract of claim 52 wherein the simmondsin is extracted from a defatted meal of Jojoba.

54. The extract of claim 52 wherein the non-chlorinated fluorocarbon solvent is 1,1,1,2-tetrafluoroethane.

55. The extract of claim 52 wherein the simmondsin is extracted from the Jojoba with a continuous cascading extraction method.

56. The extract of claim 52 which is in the form of a tablet, capsule, pastille or elixir.

57. A method for satiating hunger in a human being to aid in weight reduction, the method comprising administering an extract of Jojoba comprising simmondsin to the human being.

58. The method of claim 57 wherein the extract is in the form of a tablet, capsule, pastille or elixir.

59. The method of claim 57 wherein the extract is obtained from a defatted meal of Jojoba by extraction with a non-chlorinated fluorocarbon solvent.

60. An ingestible formula for use as a health tonic and to support sexual function comprising a plurality of bioactive substances extracted from Turnera species and Pfaffia species by a continuous cascading extraction with a non-chlorinated fluorocarbon solvent.

61. The formula of claim 60 wherein the sexual function supported is male, female or both.

62. The formula of claim 60 further comprising a therapeutic concentration of at least one bioactive substance from at least one other natural source.

63. The formula of claim 62 wherein the at least one other natural source is selected from the group consisting of Ptychopetalum olacoides, liriosma ovata, Chaunochiton kappleri, muira pauma, and a combination thereof.

64. The formula of claim 60 wherein the Turnera species is Turnera diffusa, and the Pfaffia species is Pfaffia paniculata.

65. The formula of claim 60 which is in the form of a tablet, capsule, pastille, or elixir.

66. An ingestible formula comprising a therapeutic quantity of at least one bioactive substance extracted from a Turnera species and a therapeutic quantity of at least one bioactive substance extracted from a Pfaffia species, wherein the at least one bioactive substance extracted from a Turnera species and the at least one bioactive substance extracted

from a Pfaffia species, are extracted with an organic solvent, water, an organic solvent/water mixture, a supercritical fluid extraction, a dense gas extraction, or a combination thereof.

67. The formula of claim 66 wherein the Turnera species is Turnera diffusa, and the Pfaffia species is Pfaffia paniculata.

68. The formula of claim 66 wherein the organic solvent is methanol, ethanol, ethyl acetate, or a combination thereof.

69. The formula of claim 66 wherein the therapeutic first quantity at least one bioactive substance extracted from a Turnera species is selected from the group consisting of β-sitosterol, arbutin, caffeine, gonzalitosin, hexacosan-1-ol, tetraphyllin B, N-triacontane, tricosan-2-one, paracymene, a-pinene, ß-pinene and combinations thereof.

70. The formula of claim 66 wherein the therapeutic first quantity at least one bioactive substance extracted from a Pfaffia species is selected from the group consisting of allantoin, daucosterol, β-ecdysone, pfaffic acid, pfaffosides A, B, C, D, E, and F , polypodine B, β-sitosterol, stigmasterol, stigmasterol-3-O-β-D-glucoside and combinations thereof.

71. An ingestible formula for use as a non-steroidal anti-inflammatory comprising a plurality of bioactive substances extracted from Heimia species by an organic solvent, water, an organic solvent/water mixture, a near-critical or supercritical fluid extraction, a dense gas extraction, or a continuous cascading extraction with a non-chlorinated fluorocarbon solvent.

72. The formula of claim 71 further comprising a therapeutic concentration of at least one bioactive substance from at least one other natural source.

73. The formula of claim 71 wherein the Heimia species is Heimia salicifolia.

74. The formula of claim 71 which is in the form of a tablet, capsule, pastille, or elixir.

75. An ingestible formula comprising a therapeutic quantity of at least one bioactive substance extracted from a Heimia species, wherein the at least one bioactive substance extracted from a Heimia species, are extracted with an organic solvent, water, an organic

solvent/water mixture, a near-critical fluid extraction, a supercritical fluid extraction, a dense gas extraction, or a combination thereof.

76. The formula of claim 75 wherein the Heimia species is Heimia salicifolia.

77. The formula of claim 75 wherein the organic solvent is methanol, ethanol, ethyl acetate or combinations thereof.

78. The formula of claim 75 wherein the therapeutic first quantity at least one bioactive substance extracted from a Heimia species is selected from the group consisting of cryogenine, nesodine, vertine, lytrine, lyfoline, demethoxyabresoline, epidemethoxylabresoline, demethyllasubine-I, demethyllasubine-II and combinations thereof.

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